LM2727 Design Document

National Semiconductor
LM2727
June 2006

1.0 Design Specifications

Inputs	Outputs #1
VinMin=4.5	Vout1=2.5
VinMax=5.5	Iout1=3

2.0 Design Description

The design uses a LM2727 synchronous controller utilizing external high side and low side N-channel MOSFETs operating at 300kHz. Operating the design at 300Khz aids in having higher efficiency as opposed to operating at higher frequencies. Careful PC board layout is critical to achieve low switching losses and clean, stable operation. The switching power stage requires particular attention. Few points to note for this design are:

1) Decoupling capacitors are close to IC pins as possible. Keep separate power ground plane.

2) Input and output capacitors are connected to the power ground plane; all other capacitors are connected to the signal ground plane.

3) High current paths are very short.

4) Multiple MOSFETs have been used to reduce the conduction and switching losses

5) Feedback connections are short and direct and routed away from any noisy traces (i.e. switch node).

6) High-side MOSFETs are as close as possible to the controller

3.0 Schematic

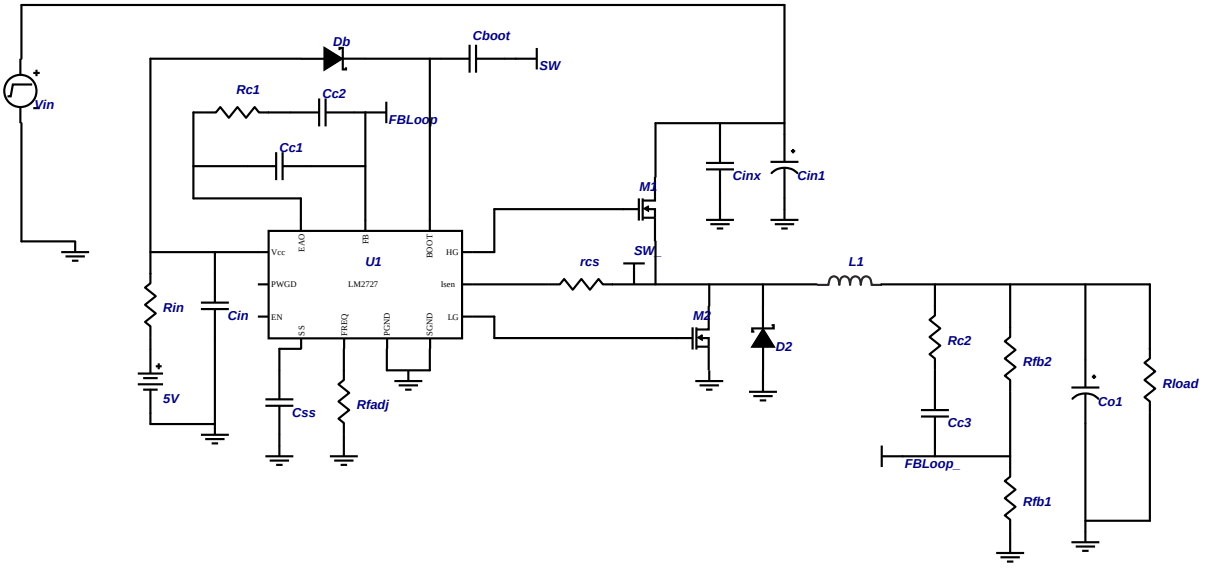

FIGURE 1. Example Schematic Showing Connection for all Components.

4.0 Bill Of Materials

Part	Manufacturer	Part#	Attributes
Cboot	Vishay	VJ1206Y104KXXAT	0.1u F
Cc1	Vishay	VJ1206A100KXXAT	10p F
Cc2	Vishay	VJ1206A391KXXAT	390p F
Cc3	Vishay	VJ1206Y122KXXAT	1.2n F
Cin	TDK	C3216X5R1A106K	NumCaps=1, 10u F

Part	Manufacturer	Part#	Attributes
Cin1	Sanyo	16MV470WG	470u F, 0.036 Ohms
Cinx	TDK	C3216X5R0J225M	2.2u F
Co1	Sanyo	16MV470WG	470u F, 0.036 Ohms
Css	Vishay	VJ1206Y123KXXAT	0.012u F
D2	ONSEMI	MBR0520	0.385 V
Db	ONSEMI	MBR0520	0.385 V
L1	Coilcraft	DO3316P-332	3.3u H, 0.015 Ohms
M1	Siliconix	SI4408DY	
M2	Siliconix	SI4408DY	
Rc1	Vishay	CRCW12061183FRT6	118K Ohms
Rc2	Vishay	CRCW12061212FRT6	12.12K Ohms
Rfadj	Vishay	CRCW12068872FRT6	88.7K Ohms
Rfb1	Vishay	CRCW12062052FRT6	20.5k Ohms
Rfb2	Vishay	CRCW12062212FRT6	22.1K Ohms
Rin	Vishay	CRCW120610R0FRT6	10 Ohms
U1	National Semiconductor	LM2727	
rcs	Vishay	CRCW12062001FRT6	

5.0 Waveforms

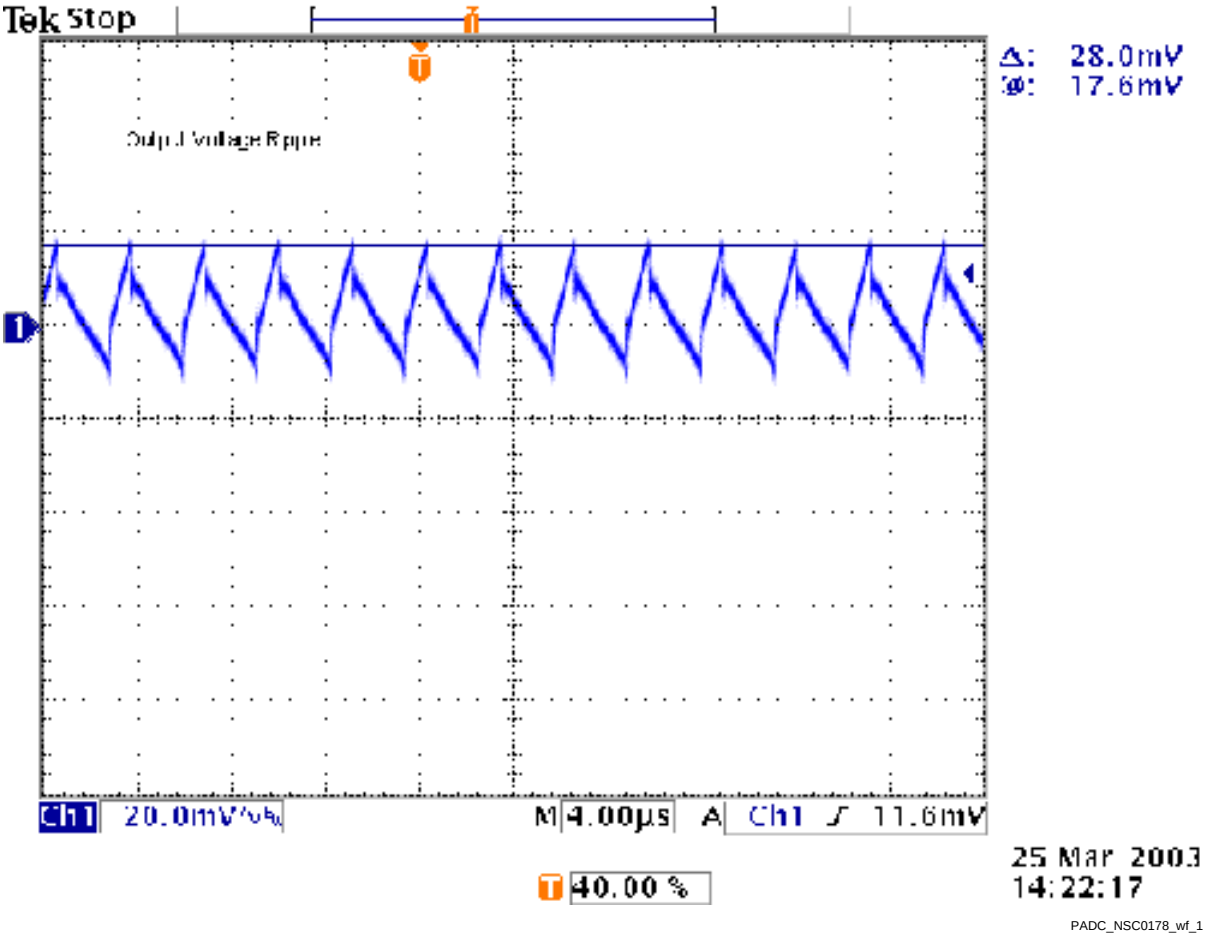

FIGURE 2. Output Ripple Voltage

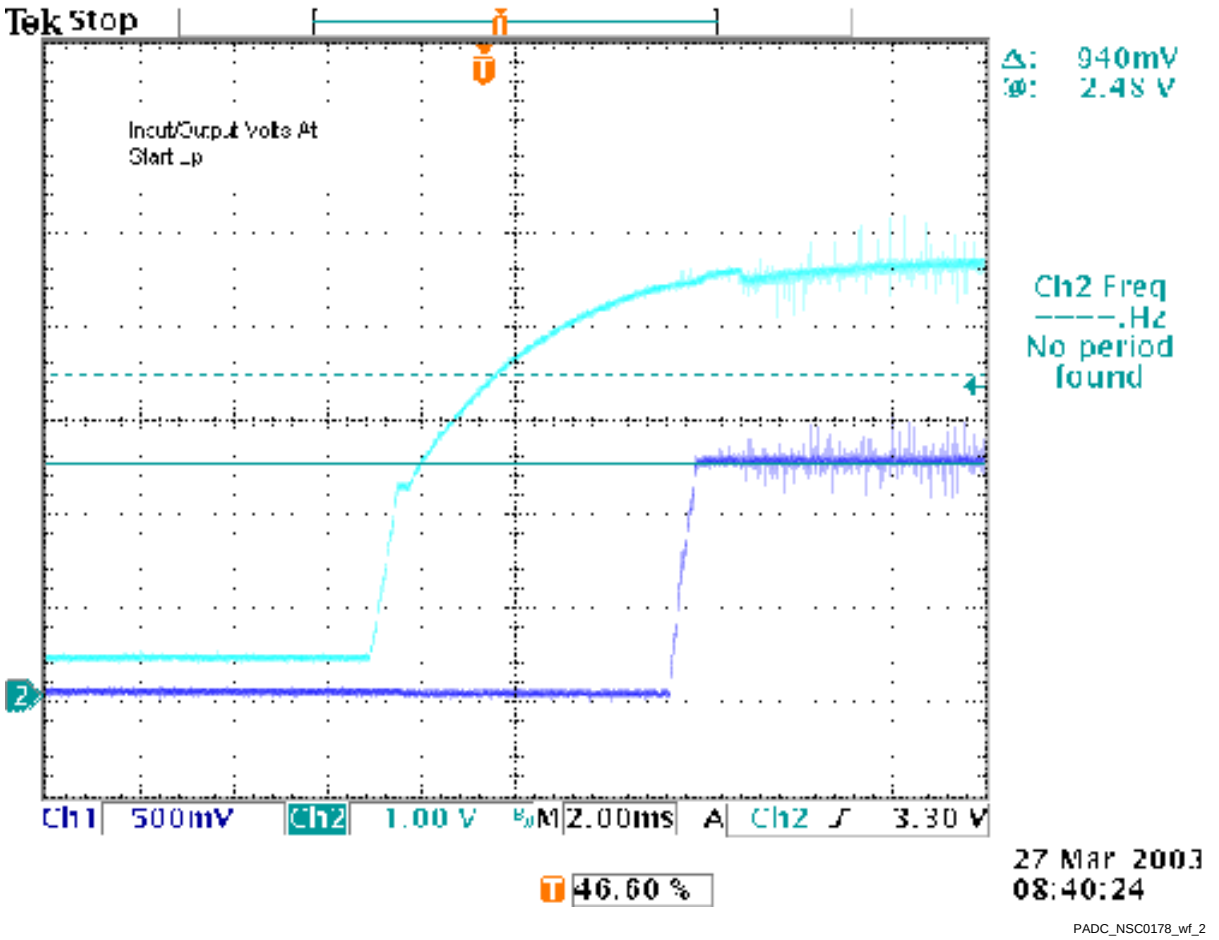

FIGURE 3. Start Up

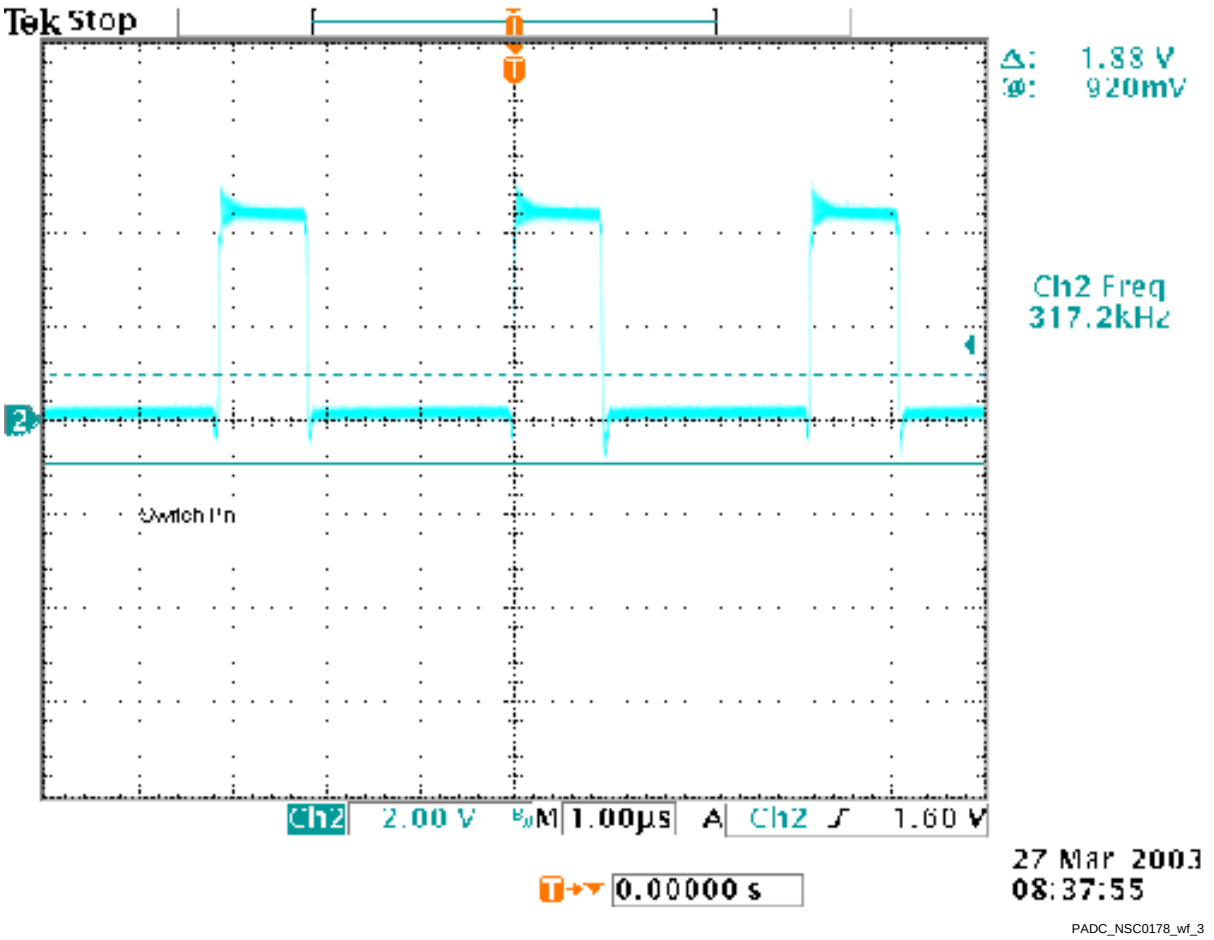

FIGURE 4. Switch pin

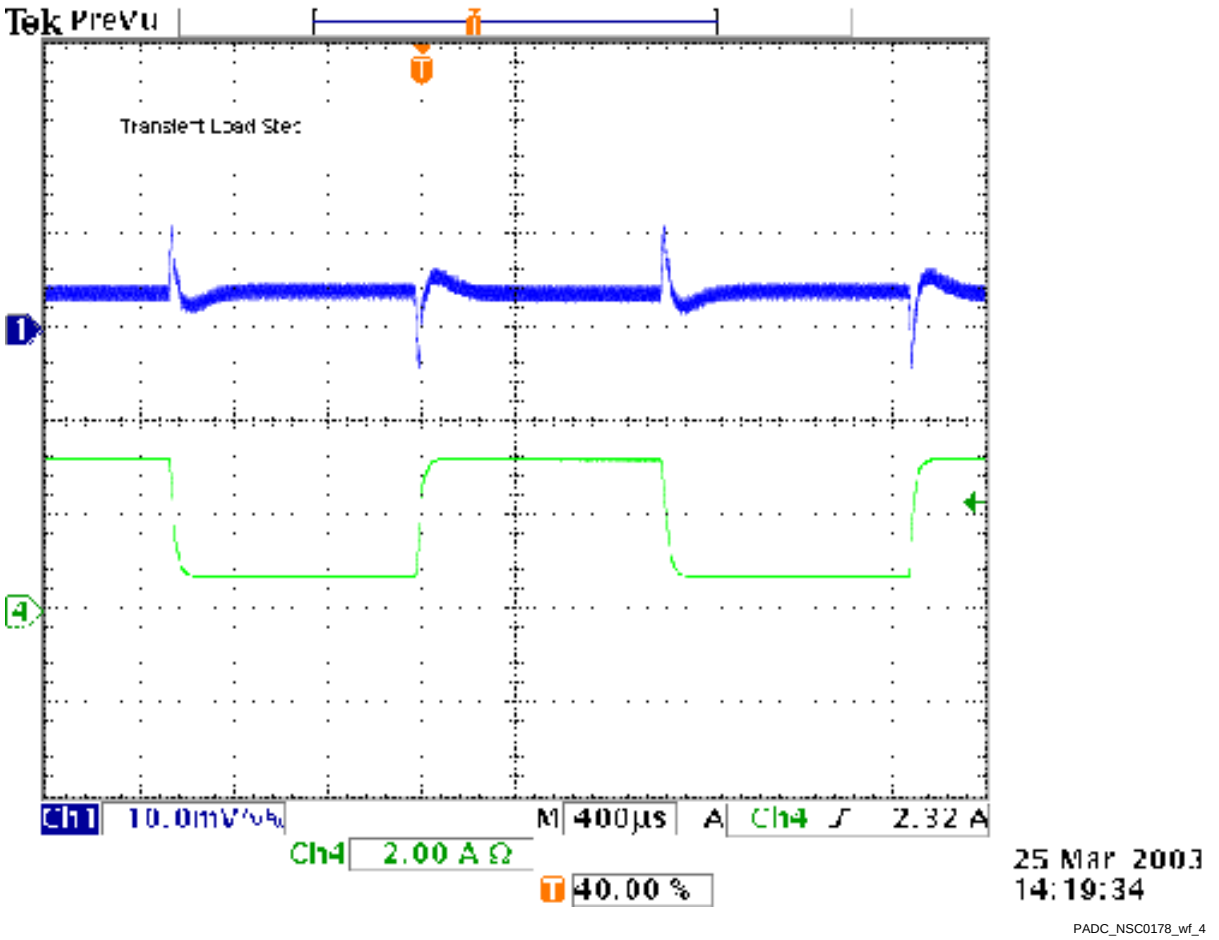

FIGURE 5. Transient Load Step

Notes

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